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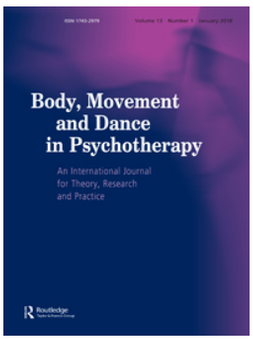

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A psychomotor diagnostic instrument for patients with post-traumatic stress disorder

Minke M. van de Kamp[a], Claudia Emck[b], Pim Cuijpers[b] and Peter J. Beek[b]

[a]Specialized centre for trauma treatment, PsyQ, The Hague, The Netherlands; [b]Faculty of Behavioural and Movement Sciences, Vrije Universiteit, Amsterdam, The Netherlands

ABSTRACT

Posttraumatic stress disorder (PTSD) is associated with an increased risk of physical disorders as a consequence of chronic stress reactions and adverse lifestyle behaviours. In addition, various other physical signs and symptoms may be present, as well as problems with emotional awareness, such as alexithymia, which may impede verbal information processing. Therefore, a psychomotor diagnostic instrument (PMDI) is developed, based on non-verbal information to contribute to a careful and reliable diagnostic procedure. The PDMI is designed to identify specific goals for body and movement oriented treatments of PTSD. It consists of a manual with an assessment procedure, guidelines for scoring items and for the calculation of cluster scores based on item scores. In this paper, the PMDI and its development are discussed, and illustrated by brief vignettes.

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KEYWORDS PTSD; psychomotor therapy; observation; assessment; treatment planning; diagnosis

Introduction

Posttraumatic Stress Disorder (PTSD) is a chronic and debilitating disorder that is characterised by symptoms of re-experiencing, avoidance, emotional numbing and hyperarousal as a consequence of one or more traumatising experiences (American Psyciatric Association [APA], 2013). In addition, PTSD is accompanied by high rates of co-morbid psychiatric disorders, in particular depressive disorders, anxiety disorders and somatoform disorders (Jacobi et al., 2004) as well as a broad range of somatic symptoms (Gupta, 2013).

Exposure to a traumatic event increases the risk of physical disorders, such as cardiovascular and neurohormonal disorders, dysfunctions of the immune system, digestive and musculoskeletal disorders, resulting in high health care

CONTACT Minke M. van de Kamp minke.vandekamp@psyq.nl

consumption and associated costs (D'Andrea, Sharma, Zelechoski, & Spinazzola, 2011; Gupta, 2013). These conditions are associated with acute and chronic stress reactions and adverse lifestyle behaviours (Godfrey, Lindamer, Mostoufi, & Afari, 2013; Sumner et al., 2015). Furthermore, physical reactions, such as pain, physical numbing, depersonalization or alienation from the body, increased muscle tension and soreness, psychomotor agitation and negative body image/experience are often reported following traumatic events (Ogden & Minton, 2000; Pole, 2007; Scheffers et al., 2017). In current clinical practice, however, very little attention is given to these often debilitating physical aspects (APA, 2017), although in the last decade there has been an upsurge of psychophysiological studies on PTSD (Bovin, Jager-Hyman, Gold, Marx, & Sloan, 2008; Pole, 2007; Rocha-Rego et al., 2009).

In line with this literature, body and movement oriented forms of therapy for PTSD have been developed (Kim, Schneider, Kravitz, Mermier, & Burge, 2013; Koch & Weidinger-von der Recke, 2009; van der Kolk et al., 2014; Ogden & Minton, 2000; Rosenbaum, Sherrington, & Tiedemann, 2014). These interventions generally aim to decrease PTSD symptomatology and increase psychosocial and physiological well-being by increasing body awareness and integrating cognitive, affective and somatic processing, which is considered necessary to achieve effective regulation of arousal and emotions (van der Kolk, 2006; van der Kolk et al., 2014; Ogden & Minton, 2000). This consideration is based on research on embodiment in regulation of arousal and emotions, such as the work by Damasio (2003), Gallese (2007), Rainville, Bechara, Naqvi, and Damasio (2006), and Siegel (2007). Since there is a wide range of body and movement oriented forms of therapy, the collective term body oriented psychotherapy (BOP) is used here, in line with Röhricht (2009).

PTSD is usually diagnosed based on self-report questionnaires such as the Davidson Trauma Scale (Davidson, Tharwani, & Connor, 2002) or clinical interviews like the Clinician-Administered PTSD Scale (Blake et al., 1995). The verbal or written information given by the patient is essential in these diagnostic methods. However, this information is limited by response biases. In order to provide reliable information, the patient needs to be sufficiently aware of feelings and symptoms, and to be able to recognise, label and interpret these experiences. As this may be problematic in some patients with PTSD, for example when there are issues in terms of emotional awareness, such as alexithymia (Frewen, Dozois, Neufeld, & Lanius, 2008; Lanius, Bluhm, & Frewen, 2011), additional diagnostic methods are needed that appeal to trauma-related feelings, cognitions and behaviours. Hence, methods that utilise non-verbal information, i.e. movement behaviour, body posture and facial expression, may contribute to a more reliable diagnostic procedure. In this context, the concept of diagnosis implies the assessment of diverse aspects of adaptive and maladaptive functioning as well as treatment planning.

A psychomotor diagnostic procedure, in which the patient is observed for physical reactions during body and movement oriented exercises, may provide

valuable information about symptomatology, clinical features and global functioning of patients with PTSD. The present paper aims to introduce a psychomotor diagnostic instrument (PMDI) to clinicians working in the field of BOP. The PMDI can be used for additional diagnostic information for various forms of treatment for PTSD; it is not restricted to BOP, however, in this article we focus specifically on BOP. It is recommended that the PMDI is administered by an experienced therapist for the following reasons. First of all, PTSD is a condition that is associated with intense emotional states, states of re-experiencing and/or dissociation, as well as problems in interpersonal contact. It is therefore essential to realise a working alliance with the patient within the context of a structured assessment procedure, which requires the clinical skills of an experienced therapist. Secondly, the PMDI requires simultaneous participation and observation, which brings along an extensive load on cognitive capability, information processing and behavioural regulation on the part of the therapist. Therefore, training may be useful to enhance a safe and professional use of the PMDI. Although the PMDI has not yet been validated extensively, it is currently being implemented in clinical practice in the Netherlands because no other instruments are available for this group of patients for whom current diagnostic procedures may fall short. The use and purpose of the instrument is illustrated with case examples of two patients with PTSD, for privacy reasons the names in this article are feigned.

Mrs N is a 50-year-old woman of Afghan origin. She suffers from PTSD and depression as a consequence of both war-related traumas and physical violence in her marriage. She has recurring nightmares, mostly about the physical violence, avoids thinking about the past and contact with people (she only keeps in touch with her children). She is hypervigilant and has troubles with concentrating and sleeping. She also suffers from physical re-experiencing, especially when she is alone: she explains that she 'literally feels the pain of the beatings and the way he squeezed her throat'. In addition, she has daily headaches and often feels tired. The PMDI is administered at the start of a psychomotor therapy program.

Mr C is a 27-year-old Dutch man who was admitted to an acute psychiatric ward after a severe suicide attempt. He reports problems with sleeping, being unable to relax, decreased interest in daily activities, feeling lonely and isolated, and abusing alcohol. Most of the time, he retreats to his room and says he doesn't like talking about his problems. Diagnostics are still unclear, but PTSD is considered as a possibility; more information is needed and therefore the PMDI is administered.

The development of the PMDI

Zwart (2004, 2005, in Dutch) developed the PMDI for traumatised refugees and asylum seekers. From the original 2004 study by Zwart, it was concluded that the PMDI was acceptable and tolerable, and provided useful information for individual treatment planning, not only for refugees and asylum seekers, but also for a more general population of patients with PTSD. Based on this initial success, the

PDMI was developed further in subsequent years. The PMDI consisted originally of a qualitative description of the patient's psychomotor behaviour. In line with contemporary thinking and practice in the Dutch healthcare system, the need became apparent to further develop this instrument for the purpose of quantitative assessment and to examine the reliability and validity of the instrument. This development took place from 2007 to 2013 and involved a close collaboration between the first author of this article and the original developer of the PMDI. After this phase, several student projects were conducted, aimed at examining the acceptability and applicability of the PMDI in subgroups of patients with PTSD: patients with high levels of dissociation, patients with PTSD and physical problems (Honkoop, 2015, in Dutch) and patients with PTSD in a forensic treatment setting (van den Hoek, 2015; in Dutch). It was found that the PMDI was acceptable and tolerable in all groups. Also a first study on reliability and validity of the PMDI was conducted (Huizing & Witte, 2015, in Dutch), with the aid of an expert panel from the Dutch society for Psychomotor Therapy (NVPMT), which consisted of nine psychomotor therapists with clinical experience in the field of psychomotor therapy for PTSD. This led to some revisions that resulted in the current instrument. The expert panel was invited to also give their vision on the revised version of the PMDI. Although their opinion on the face and content validity was already satisfactory, they concluded that the instrument had been improved.

The PMDI is a standardised individual observational instrument. The activities and items are designed to provide information for diagnosis and treatment planning for body and movement oriented forms of treatment. Therefore, seven clusters of treatment goals were defined. These clusters – and the associated items – are explained in more detail hereafter.

Clusters of treatment goals

The PMDI was developed to examine body posture, movement behaviour, and facial expression, which are all associated with clusters of treatment goals. As such, systematic observation of these nonverbal behaviours forms the key source of information for diagnosis and treatment planning according to the PMDI. The following clusters can be regarded as a subscale of the PMDI, with a set of observation items covering its content.

(1) *Stress level* refers to the amount of tension and increased arousal. It is related to muscle tone in body posture and movement, breath and startle responses.
(2) *Physical and emotional numbing* refers to the degree of decreased arousal and numbness. It is related to monotonous movement behaviour, weak and passive body-posture or lack of facial expression.

Clusters one (stress level) and two (physical and emotional numbing) both pertain to arousal dysregulation (see: Ogden & Minton, 2000). Arousal

dysregulation problems are 'core symptoms' of PTSD (APA, 2013). They are linked to other symptoms, such as physical health problems (D'Andrea et al., 2011), orientation and concentration problems (Ogden & Minton, 2000; Schauer & Elbert, 2010) and impulsive aggressive behaviour (Taft et al., 2007). BOP aims to regulate arousal, by increasing body- and sensory awareness, and learning techniques to regulate arousal. These techniques vary from yoga (van der Kolk et al., 2014) and breathing based interventions (Seppälä et al., 2014) to physical activation (Rosenbaum et al., 2014). The effectiveness of these interventions in reducing PTSD symptoms, stress and anxiety levels and dissociative problems has been shown in studies using measures based on self-report (van der Kolk et al., 2014; Price, 2005; Rosenbaum et al., 2014) and also in studies using psychophysiological measures (Kim, Schneider, Bevans, et al., 2013; Rosenbaum et al., 2014; Seppälä et al., 2014). As such, BOP can be regarded as an evidence-based strategy to treat arousal dysregulation in trauma-related psychopathology.

(3) *Physical fitness and vitality* refers to the degree of problems in fitness and vitality, which influence motor behaviour. It is related to stiff and/or rigid movements, low levels of strength and energy or not being able to complete the activities due to physical problems.

As already stated, PTSD is often associated with a broad range of somatic symptoms (D'Andrea et al., 2011; Godfrey et al., 2013; Sumner et al., 2015). Sports and exercise are known to enhance both physical and mental health, and to reduce the risk of a broad range of physical health problems (Penedo & Dahn, 2005; World Health Organization, 2003). Also various studies have shown physical health benefits of yoga in both healthy and diseased populations (Büssing, Michalsen, Khalsa, Telles, & Sherman, 2012; Ross & Thomas, 2010). As in many forms of BOP, exercise and yoga based interventions are an essential part of the therapy (Probst, Knapen, Poot, & Vancampfort, 2010; Röhricht, 2009), BOP may also decrease or prevent physical health problems in PTSD (Price, McBride, Hyerle, & Kivlahan, 2007). Interestingly, few studies on the effectiveness of BOP for PTSD also administered a measure of physical complaints, fitness or vitality. Rosenbaum et al. (2014) studied the effects of exercise augmentation in PTSD. In this study, participants in the intervention group showed significant improvements in health related measures like body fat percentage, body mass index, body weight and waist circumference. In the study by Price (2005), the participants of both the massage group and the body-oriented therapy group showed improvements in number and frequency of physical complaints and the discomfort they experienced from these complaints.

(4) *Orientation, concentration and attention* refers to the amount of problems in attention and concentration, flashbacks and dissociative problems. It is related to the inability to focus on the activities, staring/fixated gaze and inadequate or dysfunctional movements.

People with PTSD show impairments in attention, concentration and orientation, as part of the clusters B and E, and the dissociative subtype of DSM-V diagnosis (APA, 2013). BOP may be indicated to curtail these problems by increasing sensory awareness of external (e.g. vision) and internal stimuli (e.g. breath). A sensory learning program resulted in decrease in symptoms of complex traumatic stress (Kaiser, Gillette, & Spinazzola, 2010). In other studies on BOP for PTSD, enhancing body- and sensory awareness was an important part of the intervention (Price, 2005; Stoller, Greuel, Cimini, Fowler, & Koomar, 2012; Van der Kolk, 2014). As such, sensory processing might be an important element for BOP in PTSD, and should be studied more in depth.

(5) *Empowerment and assertiveness* refers to the degree to which the patient has difficulty with recognising and responding to their own needs and boundaries. It is related to frequent asking for endorsement, and saying 'stop' to the approaching psychomotor therapist too late or unclearly in the controlled approach activity.
(6) *Safety and trust* refers to the degree of feelings of danger and mistrust in contact with the therapist, the material and/or surrounding. It is related to alertness of the surrounding or the therapist or avoiding contact with the therapist and/or material.

Interpersonal problems, such as problems with empowerment and assertiveness and feelings of danger and mistrust in social contact, are often mentioned in literature concerning trauma (Clapp et al., 2014; Classen, 2006; David, Simpson, & Cotton, 2006). These problems have a large neurophysiological component, like dysfunctions in autonomic regulation and ineffective recruitment of defensive behaviour (Ardizzi et al., 2013, 2016; Steuwe et al., 2012). A broad range of BOP interventions has been developed to address these difficulties, like learning to mobilise and safely use physical power, teaching self-defensive techniques, increasing awareness of bodily signals of personal space and boundaries, and learning techniques for auto- and interactional self-soothing (David et al., 2006; Langmuir, Kirsh, & Classen, 2012; Levine & Land, 2016; Ogden & Minton, 2000). Although these interventions vary a lot, and working mechanisms are not yet sufficiently specified, the interventions aimed on interpersonal problems are outlined as an important part of BOP for PTSD in these studies.

(7) *Impulsive aggressive behaviour* refers to the amount of impulsive and uncontrolled outwardly directed anger. It is related to fierce and abrupt movements, inability to or limitations in conducting the activities, and non-verbal expression of increased anger.

Many patients with PTSD have problems with impulsive aggressive behaviour (Olatunji, Ciesielski, & Tolin, 2010). Although other forms of aggressive behaviour may also occur in PTSD, the greater part is impulsive and reactive in nature (Teten et al., 2010). Problems in hyperarousal, and in recognising and

verbalising emotions are often at the basis of impulsive aggressive behaviour in PTSD (Denson, Pedersen, Ronquillo, & Nandy, 2009). Therefore, BOP aimed on increasing body awareness and arousal regulation – see clusters one and two –, increasing emotional awareness, and increasing effective interpersonal (verbal and non-verbal) communication – see clusters five and six – may decrease impulsive aggressive behaviour. Kaiser et al. (2010) report from their study on a sensory learning program a significant symptom reduction in affect/impulse regulation. Staples, Hamilton, and Uddo (2013) report a decrease in state and trait anger from their study on yoga for patients with PTSD. Collinge, Kahn, and Soltysik (2012) report a significant decrease in feelings of being 'on edge/irritable' in monthly administered surveys after a relaxation and massage intervention for veterans with PTSD. In other articles on BOP for PTSD, decreases in aggressive behaviour and increases in self-control are reported, but not systematically measured (Harris, 2007; Stankovic, 2011; Zwart, 2001).

The item list

An overview of the observation items of the PMDI is presented in Table 1.

Two items are elaborated further for illustration.

(1) Emotions are blunted or absent (physical and emotional numbing):

Cues for observation and scoring: Little motion and change in facial expression. Robotic, numbed way of moving. Attitude/posture/facial expression does not change during the activities. Hardly any muscle tone in the face.

While throwing and catching the ball, Mrs N tells me she likes the activity, it reminds her of good moments from her childhood. However, in her motor behaviour and facial expression, it is not evident that she enjoys the activity. She stares with a blank expression and her movements are monotonous and inert.

(2) Gaze is staring, fixated (orientation, concentration and attention):

Cues for observation and scoring: The gaze is focused on one fixed point (for instance the therapist's face), with little or no blinking. It may seem as if the patient 'looks right through you'.

During the controlled approach exercise, Mr C suddenly has a staring and fixated gaze when I'm walking towards him. Almost immediately he says stop, when I'm still at a large distance and he keeps staring at me. When I start talking to him, his face turns to his normal appearance again. He explains that when I started walking to him, he saw his father instead of me, coming to him to beat him up. He explains later that in his childhood, his father regularly beat him up when he was drunk.

The assessment procedure

For the therapist, a manual is available, containing theoretical background information, a detailed description of the activities, and scoring instructions.

Table 1. An overview of the PMDI.

Cluster	Item
Stress level	• Movements and posture are tense and/or tight • Voice sounds high and/or pinched off • Is restless, is moving a lot • Body posture is rigid, frozen • Breathing is frequently accelerated or disrupted • Dodges the ball • Is startled by the ball and/or its sound • Muscle tension increases with approach • Breaks eye contact with the therapist during approach • Boxes withheld (softly with tense movements) • Movements are monotonous with increased muscle tension • Sustains tension for a long time
Physical and emotional numbing	• Avoids contact with the psychomotor therapist • Emotions are blunted or absent • Rationalises a lot during the exercises, ignores feelings • Posture is weak, passive or without energy • Movements are repetitious (with decreased muscle tension) • Boxes with blank, numbed facial expression • Moves mechanically
Physical fitness and vitality	• Physical problems impede carrying out the activity • Throws the ball too softly, with indications of a physical cause • Movements are slow and/or stiff • Stops before stop signal due to poor physical fitness and/or pain • Cannot or can barely retain the muscle tension

(*Continued*)

Table 1. (*Continued*).

Cluster	Item
Orientation, concentration and attention	• Gets easily disoriented • Is unfocused • Makes dysfunctional, inadequate movements • Gaze is staring, fixated • Boxes with a staring gaze, with a facial expression(s) of emotion and/or numbness • Movements are disorganised and/or uncoordinated
Empowerment and assertiveness	• Asks for endorsement from the therapist: am I doing it right? • Allows a smaller distance than comfortable • Stop signal is unclear and/or absent • Boxes weakly
Safety and trust	• Is keeping an eye on the therapist and/or surroundings, is hyper vigilant • The execution of the activities is hampered by a high level of anxiety • Closes eyes and/or blinks • Throws the ball too softly, with indications of feelings of uncertainty • Avoids the therapist, stepping backwards or sideward • Cowers when the therapist approaches • Closes eyes, blinks and/or looks away from the punching bag
Impulsive aggressive behaviour	• A high level of anger hampers the execution of the activities • Movements are jerky and/or abrupt • Stops before stop signal, due to increased tenseness • At the second time boxing (reducing force), the force level remains equal • Boxes uncontrolled (hard) • Boxes chaotic

Note: A detailed description of the items and their interpretation is available in the instrument's manual.

The assessment procedure consists of four standardised psychomotor activities, namely:

(1) Throwing and catching a ball. First, the ball is thrown directly to the patient, starting with a curve, then straight. Subsequently it is thrown with one bounce on the floor. Finally, the patient is asked to choose how to throw the ball.
(2) An adapted version of Pesso's controlled approach exercise (Pesso, 1988). First the therapist approaches the patient while throwing and catching a ball, with the instruction to the patient: 'Say "stop" when the distance feels comfortable to you to throw and catch the ball or when it starts to feel uncomfortable'. Then, the exercise is repeated without throwing and catching a ball.
(3) Boxing on a punching bag. First, the patient is asked to box for one minute in a way that feels good. Next, the patient is asked to box for another minute, starting powerful and during the minute decrease the power until boxing softly.
(4) An adapted version of Jacobson's relaxation exercise (Jacobson, 1938). The activity is performed while sitting, four muscle groups in the upper body (shoulders, upper back, abdomen, and arms) are tightened and relaxed, each three times. Then all four muscle groups are tightened simultaneously three times, and the patient is asked to decide when to relax.

A standardised individual observation procedure takes place, in which a patient is asked to perform the four activities. During these activities, the role of the therapist is characterised by active participation. Based on behavioural observations, the therapist fills out a structured scoring form with items concerning body posture, movement behaviour, and facial expression. The items are related to the four activities. Additionally, some general observations are scored during and between the four activities. The item list consists of 15 general items, 9 items concerning throwing and catching a ball, 15 items concerning the controlled approach exercise, 17 items concerning boxing on a punching bag, and 10 items concerning the relaxation exercise. The items represent behaviours, which can be scored on a 4 point scale, ranging from 0 (not present) to 3 (severely present). High item scores indicate more problematic behaviour. The items are linked to the treatment clusters (see Table 1). For each treatment cluster the mean score of the observation items is calculated; high cluster scores suggest treatment indications. The scores on treatment clusters do not automatically lead to treatment plans. The therapist needs to interpret them, try to understand their possible connection, and subsequently explain and discuss this with the patient, for fine-tuning individual goals treatment planning.

For Mrs N the cluster scores are high for physical and emotional numbing, Orientation, concentration and attention and impulsive aggressive behaviour.

When we talk afterwards about the activities and especially about the boxing activity, their interconnection becomes clear. Her daily state is a bit flat and numb, but when she is triggered – as happened during the boxing activity – she suddenly has intrusive flashbacks and consequently loses her self-control. At home, she displays no aggressive behaviour to people around her, but when she loses her self-control, she starts hitting herself and pulling her hair, she explains ashamed. The first phase of her treatment entails a psychomotor intervention focused on enhancing body awareness and sensory perception, regulating emotions, and regaining sense of pleasure, fun and positive interactions.

For Mr C, mild problems in stress level and orientation, concentration and attention are concluded. These clusters are closely related to the PTSD symptoms re-experiencing and hyperarousal, which gives an indication for mild PTSD symptomatology. He still doesn't talk much about the problems he experiences, but he recognises my observations. He is willing to take part in a short psychomotor therapy programme focused on arousal regulation. This programme is focused on enhancing awareness of physical sensations of arousal and learning techniques for arousal regulation, such as breathing exercises, stretching and physical activation (resistance training).

In Table 2, the mean cluster scores for Mrs N and Mr C are presented.

Future research and development

The PMDI has been developed for clinical use and research. Assessing its reliability and validity is therefore of crucial importance. Although only minor revisions were made after the study by Huizing and Witte (2015), further research on the reliability and validity of the current version needs to conducted and is currently planned. It would be interesting to also examine differences in PMDI scores between different groups of patients with PTSD (e.g. veterans, victims of childhood abuse, civilian victims of war and/or torture …) and in healthy volunteers as a comparison group. Furthermore, it would be interesting to study the possible influence of co-morbid disorders, and history of sports participation on PMDI scores and understanding possible influences of cultural experience and behaviours in PMDI scores and participation.

Table 2. *Mean cluster scores for Mrs N and Mr C.*

Cluster	*Mrs N*	*Mr C*
Stress level	*.88*	*.75*
Physical and emotional numbing	*1.88*	*.38*
Physical fitness and vitality	*.40*	*.20*
Orientation, concentration and attention	*1.43*	*.86*
Empowerment and assertiveness	*.25*	*.00*
Safety and trust	*.33*	*.33*
Impulsive aggressive behaviour	*1.50*	*.33*

Note: High cluster scores indicate more problematic behaviour in the specific cluster, which suggests indications for treatment.

The development and application of standardised and structured psychomotor diagnostics in a psychotherapeutic context is relatively new, but could nevertheless be valuable. Psychomotor diagnosis is currently used in the field of child psychiatry (Emck & Bosscher, 2010) and adults with intellectual disability (Kay, Clegg, Emck, & Standen, 2016). In these studies, the diagnostic instruments are described as clinically relevant, reliable and valid as a starting point for psychomotor therapy and/or dance movement (psycho) therapy. The possibility to apply psychomotor diagnostics for measuring effect of treatment has not been explored yet. As they provide supplementary information about symptomatology, clinical features and global functioning, this could be a valuable direction for future research on psychomotor diagnostic instruments such as the PsyMot (Emck & Bosscher, 2010; Kay et al., 2016) and the PMDI.

Taken together, the PMDI is a diagnostic tool for additional diagnostic information for various forms of treatment for PTSD and to formulate treatment goals for BOP in patients with PTSD. It addresses the need for a more non-verbally oriented diagnostic instrument for this group of highly complex patients. It provides supplementary information to the self-report questionnaires and clinical interviews and provides immediate starting points for body and movement oriented forms of treatment, such as psychomotor and dance movement therapy. Furthermore, by using this instrument, specific treatment goals can be determined, and the additional information allows therapists to fine-tune their methods and tailor them to the specific needs of the patients, which makes their treatment more effective and possibly less time consuming.

Disclosure statement

No potential conflict of interest was reported by the authors.

Notes on contributors

Minke M. van de Kamp, MSc, is a psychomotor therapist and researcher (PhD student) at the specialised centre for trauma treatment of PsyQ The Hague (The Netherlands) and an acute psychiatric ward at Bavo Europoort, Capelle aan den Ijssel (The Netherlands). She is specialised in psychomotor diagnosis and interventions for patients with post-traumatic stress disorder. Her research is supervised by Dr Claudia Emck, Prof. Dr Pim Cuijpers and Prof. Dr Peter J. Beek at the Vrije Universiteit Amsterdam (The Netherlands).

Claudia Emck, PhD, (psychomotor therapist, clinical and health psychologist) is assistant professor at the Faculty of Behavioural and Movement Sciences, Vrije Universiteit Amsterdam (The Netherlands). She is specialised in psychomotor diagnosis and interventions for people with psychiatric disorders, with a special interest in gross motor performance and body experience in neurodevelopmental disorders (Autism, ADHD, Intellectual disabilities).

Pim Cuijpers is Professor of Clinical Psychology at the Vrije Universiteit Amsterdam (The Netherlands), and Head of the Department of Clinical, Neuro and Developmental Psychology. He is specialised in conducting randomised controlled trials and meta-analyses on prevention and psychological treatments of common mental disorders. Much of his work is aimed at prevention of mental disorders, psychological treatments of depression and anxiety disorders, and Internet-delivered treatments.

Peter J. Beek is Professor of Coordination dynamics and Dean at the Faculty of Behavioural and Movement sciences at the Vrije Universiteit Amsterdam (The Netherlands). His research focuses on the control and coordination of human movement, including the coupling between perception and action, and the acquisition of perceptual-motor skills, and ranges from fundamental studies to applications in sports and rehabilitation. He is Editor-in-chief of the multidisciplinary journal Human Movement Science.

ORCID

Pim Cuijpers http://orcid.org/0000-0001-5497-2743

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